AMENDMENTS TO THE CLAIMS

The following is a complete, marked up listing of revised claims with a status identifier in parentheses, underlined text indicating insertions, and strikethrough and/or double brackets indicating deletions.

Listing of the Claims

1. (CURRENTLY AMENDED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising:

bringing a raw material gas and a catalyst into contact with each other under reaction conditions so as to produce a carbon nanostructure, wherein:

initiation of the contact between the raw material gas and the catalyst is carried out instantaneously by:

(a) instantaneously initiating, under electronic control or computer control, feed of the raw material gas to the catalyst that is stationary in a reaction chamber;

(b) under a condition where the raw material gas is built up, causing the catalyst to instantaneously move from outside the raw material gas to inside the raw material gas;

(c) under a condition where the raw material gas is built up, instantaneously spraying powders of the catalyst to the raw material gas so that the catalyst is instantaneously moved from outside the raw material gas to inside the raw material gas; or

(d) under a condition where the catalyst is placed in the raw material gas that is built up, subjecting the catalyst to beam irradiation, infrared beam irradiation, electron beam radiation, or ion beam irradiation so that a temperature of the catalyst or a temperature in a vicinity of the catalyst is instantaneously increased to a reaction temperature.

2.-5. (CANCELLED)

6. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein:

stopping of the contact between the raw material gas and the catalyst under the reaction conditions is carried out instantaneously.

7. (CANCELLED)

8. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising:

feeding carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, wherein:

a total flow quantity of the carrier gas and the raw material gas is controlled to be constant all the time in such a manner that in instantaneously initiating feed of the raw material gas of a predetermined flow quantity, a flow quantity of the carrier gas is

instantaneously decreased proportionately, whereas in instantaneously interrupting feed of the raw material gas, a flow quantity of the carrier gas is instantaneously increased proportionately.

9. (PREVIOUSLY PRESENTED) A high-efficiency synthesis method of a carbon nanostructure, the method comprising: feeding carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, wherein:

a total flow quantity of the carrier gas and the raw material gas is controlled to be constant all the time in such a manner that in a reaction process, feed flow quantity levels of the raw material gas are changed in a plurality of levels, and when the feed flow quantity of the raw material gas is instantaneously increased or decreased by some quantity, a feed flow quantity of the carrier gas is instantaneously decreased or increased proportionately.

10. (WITHDRAWN) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity; and

an electromagnetic three-way valve which instantaneously feeds or interrupts the raw material gas which is controlled to be of a

predetermined flow quantity, with respect to the reaction chamber, wherein:

at the time of interrupting the raw material gas, the electromagnetic three-way valve is instantaneously switched to exhaust position so that feed of the raw material gas is interrupted, and at the time of feeding the raw material gas, the electromagnetic three-way valve is instantaneously switched to feed position so that the raw material gas of a predetermined flow quantity is fed to the reaction chamber.

11. (WITHDRAWN) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity;

a first electromagnetic three-way valve which instantaneously feeds or interrupts the raw material gas which is controlled to be of a predetermined flow quantity, with respect to the reaction chamber; and

a second electromagnetic three-way valve which instantaneously feeds or interrupts the carrier gas whose flow quantity is controlled to be the same as the predetermined flow quantity of the raw material gas, with respect to the reaction chamber, wherein:

a total flow quantity of the carrier gas and the raw material gas, which is fed to the reaction chamber including the carrier gas of the basic flow quantity, is controlled to be constant in such a manner that at the time of feeding the raw material gas with the first electromagnetic three-way valve, the carrier gas is interrupted with the second electromagnetic three-way valve, and at the time of interrupting the raw material gas with the first electromagnetic three-way valve, the carrier gas is fed with the second electromagnetic three-way valve.

12. (WITHDRAWN) A high-efficiency synthesis apparatus of a carbon nanostructure, which feeds carrier gas and raw material gas to a reaction chamber so as to produce a carbon nanostructure by catalysis, the apparatus comprising:

means for feeding, to the reaction chamber, the carrier gas which is controlled to be of a basic flow quantity;

a plurality of first electromagnetic three-way valves, provided in parallel with each other, which instantaneously feed or interrupt the raw material gas at respective feed flow quantity levels, so that feed flow quantity levels of the raw material gas are changed in a plurality of levels; and

a plurality of second electromagnetic three-way valves, provided in parallel with each other, which instantaneously feed or interrupt the carrier gas at respective feed flow quantity levels with respect to the reaction chamber, so that feed flow quantity levels of the carrier gas are

changed in a plurality of levels that are numerically equal to the feed flow quantity levels of the raw material gas, wherein:

a total flow quantity of the carrier gas and the raw material gas, which is fed to the reaction chamber including the carrier gas of the basic flow quantity, is controlled to be constant in such a manner that at the time of gas feed, at least one necessary electromagnetic three-way valve among the first electromagnetic three-way valves and the second electromagnetic three-way valves is switched to gas feed position, and the other electromagnetic three-way valves are switched to gas interruption position.

13. (WITHDRAWN) A carbon nanostructure which is produced by using the high-efficiency synthesis method of a carbon nanostructure according to claim 1.

14. (WITHDRAWN) The carbon nanostructure according to claim 13, which is a brush-type carbon nanotube and is realized by a high-purity carbon nanotube, grown with high density, mainly composed of graphene sheets in an outermost layer of the carbon nanotube.

15. (WITHDRAWN) The carbon nanostructure according to claim 14, wherein:

the growth is completed within 100 seconds.

16. (WITHDRAWN) The carbon nanostructure according to claim 14, wherein:

when the brush-type carbon nanotube is cleaved in arbitrary cross section, there appear thread-type carbon nanotubes in the cross section.

17.-20. (CANCELLED)

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END OF CLAIM LISTING